

**National Climatic Data Center**

**DATA DOCUMENTATION**

**FOR**

**DATA SET 6150 (DSI-6150)**

**Climate Analysis Center (CAC) Sea Surface Temperature (SST)  
Analyses**

**December 6, 2002**

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## Table of Contents

Topic	Page Number
1. Abstract.....	3
2. Element Names and Definitions: .....	4
3. Start Date.....	5
4. Stop Date.....	5
5. Coverage.....	5
6. How to order data.....	5
7. Archiving Data Center. ....	5
8. Technical Contact.....	6
9. Known Uncorrected Problems.....	6
10. Quality Statement.....	6
11. Essential Companion Data Sets.....	6
12. References.....	6

1. **Abstract:** The Climate Analysis Center's Sea Surface Temperature Data Set, referred to as "CAC SSTs", contains in situ SSTs, blended SSTs (in situ SSTs blended with AVHRR derived SSTs), blended anomalies, COADS/Ice SST Climatology, and Land/Sea Mask. The blended anomalies are produced by GSFC DAAC from the SST Climatology data provided by the Climate Analysis Center (renamed CPC - Climate Prediction Center). The in situ analyses cover 40 degrees south to 60 degrees north. All other gridded analyses are global. The values for Land/Sea Mask are available on a 0.5 X 0.5 degree latitude/longitude grid; all other gridded values are available on a 2 X 2 degree latitude/longitude grid. The in situ analyses grids are available from January, 1970, to December, 1981, inclusive. The blended analyses grids, derived from in situ SSTs and AVHRR derived SSTs, are available from January, 1982, to present. With the exception of the Land Mask, all gridded values are monthly means. The SST field is the analyzed SST which is obtained by solving Poisson's equation forced by satellite analyzed field with internal and external boundary values anchored by an in situ analysis. The climatology used here was computed using the two-degree resolution COADS data for the period (1950-1979). To improve the coverage, SST's were inferred from monthly climatological ice limits and obtained from monthly satellite SST fields. A summary of these results have been included in Reynolds (1988). The monthly climatological fields can be determined from these data by subtracting the monthly anomaly field from the monthly mean. Climatological SST values north of 80 degrees North and South of 80 degrees South should be set to -1.8 degrees C (the freezing point temperature of sea water) for all months. The CAC sea surface temperature (SST) data described in this document are of two types: (1) Sea Surface Temperature in SITU Analysis and (2) Sea Surface Temperature Blended Analysis. There are two file types.

In Sea Surface Temperature (SST) in SITU Analysis are from in SITU (ship and buoy) data only. These data are contained in files 1 and 2 discussed below.

The monthly optimum interpolation (OI) fields are derived by a linear interpretation of the weekly OI fields to daily fields, then averaging the daily fields over a month. The monthly fields are in the same format and spatial resolution as the weekly fields.

The first file contains monthly mean analyzed SST fields - the land mask used for the blended SST analysis. The second file contains the monthly-analyzed anomaly SST field (the monthly temperature has been subtracted from the means of the first file). The climatology was based on a combination of in situ and satellite SST observations, and includes SST's inferred from climatological ice limits. A complete description of the analysis procedures is given by Reynolds (1988, Journal of Climate, 1, 75-86).

Both files consist of monthly fields from January 1970 through December 1984. Each field is divided into two regions called ATLANTIC and PACIFIC. The two regions overlap and have been interpolated over land.

The SST climatology of Reynolds (1982, NOAA Technical Report NWS 31) was originally used as climatology for these analyses. However, differences between this climatology and other SST climatologies have been noted. These differences were not primarily due to analysis methods but due to the use of data from different periods of time. The Reynolds (1982) climatology includes data from the 1850's through 1970's; the other climatologies used no data prior to 1950.

The climatology used here was computed using the two-degree resolution COADS

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data for the period (1950-1979). To improve the coverage, SST's were inferred from monthly climatological ice limits and obtained from monthly satellite SST fields. A summary of these results have been included in Reynolds (1988, Journal of Climate, 1, 75-86.) The monthly climatological fields can be determined from these data by subtracting the monthly anomaly field from the monthly mean. Climatological SST values north of 80°N and south of 80°S should be set to -1.8°C (the freezing point temperature of sea water) for all months.

This data set is considered "inactive" as it has had no data added in 7 years.

## 2. Element Names and Definitions:

Both files consist of monthly fields from January 1970 through December 1984. Each field is divided into two regions called ATLANTIC and PACIFIC. The two regions overlap and have been interpolated over land. If the SST array is dimensioned SST (101,51) the SST field can be read by two reads.

```

      READ (1,1) IMO,IYR,IX,IY
1     FORMAT (4I20)
      READ (1,2) ((SST(I,J),I=1,101, J=1,51)
2     FORMAT (16F5.1)

      IMO = month (1-12)      IX=1 for ATLANTIC, 2 for PACIFIC
      IYR = year (70-84)     IY=1 for mean SST and 2 for anomaly SST

```

The first index, I, defines the longitude and J defines the latitude of the location of the SST field.

For all fields: J-1 is centered at 40°S, J-2 is at 38°S and so on to J=51 at 60°N. For the ATLANTIC fields I-1 is centered at 100°W, I-2 is at 98°W and so on to I-101 at 100°E. For the PACIFIC fields, I=1 is centered at 100°E, I-2 is at 102°E, and so on to I-101 at 60°W.

The Sea Surface Temperature (SST) Blended Analyses are contained in the third and fourth files. The third file contains the monthly-analyzed SST fields; the fourth file contains the monthly anomaly SST fields (the monthly climatology has been subtracted from the fields in the third file).

The monthly data is available from January 1982 to present on a two-degree latitude and longitude grid. These fields are analyzed from a blend of in situ and AVHRR (advanced very high resolution radiometer) satellite data. A complete description of the analysis procedures is given by Reynolds (1988, Journal of Climate, 1, 75-86).

The following statements can read files three and four if the arrays SST and IFLAG are dimensioned (180,90):

```

      READ (1,1) IDA,IMO,IYR,IY
1     FORMAT (4I20)
      READ (1,2) (SST(I,J),I=1,180), J=1,91)
2     FORMAT (16F5.1)
      READ (1,3) ((IFLAG (I,J), I=1,180), J=1,91)
3     FORMAT (80I1)

      IDA= number of days of data analyzed
      IMO= month (1-12)

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IYR= year (82 to present)  
IY= 1 for mean SST, 2 for anomaly SST

The SST field is the analyzed SST, which is obtained by solving Poisson's equation forced by a satellite-analyzed field with internal and external boundary values anchored by an in situ analysis. The IFLAG array gives information about each analyzed array as follows:

IFLAG = 0: The blended value has been anchored by the satellite analysis; there are at least 10 satellite observations per month.

IFLAG = 1: The blended value has been anchored by the in situ analysis; there are at least 5 in situ observations per month.

IFLAG = 2: The blended value has been anchored by the satellite analysis; there are less than 10 satellite observations per month.

IFLAG = 3: Pole values; the SST mean has been set to  $-1.8^{\circ}\text{C}$ ; the SST anomaly has been set to 0.

IFLAG = 5: The blended value has been determined by relaxation of the in situ analysis with satellite forcing; the number of satellite observations is at least 10 per month.

IFLAG = 6: The blended value has been determined by relaxation of the in situ analysis with the satellite forcing set to zero; the number of satellite observations is less than 10 per month.

IFLAG = 7: The blended value has been determined by extrapolation and is unreliable. Data values north of  $80^{\circ}\text{N}$  and south of  $80^{\circ}\text{S}$  always belong to this category.

The location of the SST and IFLAG arrays is defined by the first index, I, for longitude and the second index J for latitude. For I=1 the grid is centered at  $0^{\circ}$ , I=2 at  $2^{\circ}\text{E}$  and so on eastward to I=180 at  $2^{\circ}\text{W}$  ( $358^{\circ}\text{E}$ ). For J=1 the grid is centered at  $90^{\circ}\text{S}$ , J=2 at  $88^{\circ}\text{S}$  and so on northward to J=91 at  $90^{\circ}\text{N}$ .

<http://www.cpc.ncep.noaa.gov/data/cdddb/>

3. **Start Date:** 19700101
4. **Stop Date:** 19951231
5. **Coverage:** Atlantic and Pacific Oceans
6. **How to Order Data:**

Ask NCDC's Climate Services about the cost of obtaining this data set.  
Phone: 828-271-4800  
FAX: 828-271-4876  
E-mail: [NCDC.Orders@noaa.gov](mailto:NCDC.Orders@noaa.gov)

7. **Archiving Data Center:**

National Climatic Data Center  
Federal Building

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151 Patton Avenue  
Asheville, NC 28801-5001  
Phone: (828) 271-4800.

**8. Technical Contact:**

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, NC 28801-5001  
Phone: (828) 271-4800.

**9. Known Uncorrected Problems:** None.

**10. Quality Statement:** No specific information was provided with original documentation. Verifications statistics are provided in reference 2 below.

**11. Essential Companion Datasets:** None.

**12. References:**

Reynolds, R. W., and Roberts 1987: Tropical Ocean-Atmosphere Newsletter, No. 37, 15-17, published by CIMAS, University of Miami, 4600 Rickenbacker Causeway, Miami, FL 33149

Reynolds, R. W., 1988: A real-time global sea surface temperature analysis. Journal of Climate, 1, 75-86.

Reynolds, R. W., and D. C. Marsico, 1993: An improved real-time global sea surface temperature analysis. Journal of Climate, 6, 114-119.

Reynolds, R. W., and T.M. Smith, 1994: Improved global sea surface temperature analyses using optimum interpolation. Journal of Climate, 7, 929-948.

Reynolds, R. W., and T.M. Smith, 1995: A high-resolution global sea surface temperature climatology. Journal of Climate, 8, 1571-1583.

Slutz, R. J., S. J. Lubker, J. D. Hiscox, S. D. Woodruff, R. L. Jenne, D. H. Joseph, P. M. Steuer, J. D. Elms, 1985: Comprehensive Ocean-Atmosphere Data Set: Release 1. NOAA Environmental Research Laboratory, Boulder, CO, 268 pp.

["http://www.cdc.noaa.gov/cdc/data.reynolds\\_sst.html"](http://www.cdc.noaa.gov/cdc/data.reynolds_sst.html)

["http://www.cdc.noaa.gov/cdc/reynolds\\_sst.info.html"](http://www.cdc.noaa.gov/cdc/reynolds_sst.info.html)

["http://www.emc.ncep.noaa.gov/research/cmb/sst\\_analysis/"](http://www.emc.ncep.noaa.gov/research/cmb/sst_analysis/)

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